

AMENDED FY 1988/FY 1989 BIENNIAL BUDGET RDT&E DESCRIPTIVE SUMMARY

Program Element: 0102433F
 DOD Mission Area: 332-Strategic Surveillance and Warning

Title: NUDET Detection System (NDS)
 Budget Activity: 3-Strategic Programs

1. (U) RDT&E RESOURCES (PROJECT LISTING): (\$ in thousands)

<u>Project Number</u>	<u>Title</u>	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>	<u>Additional to Completion</u>	<u>Total Estimated Cost</u>
TOTAL FOR PROGRAM ELEMENT		23,212	7,369	10,922	Continuing	N/A

2. BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Strategic Air Command and Aerospace Defense Command require a highly survivable capability to detect, locate, and report any nuclear detonation (NUDET) on a global basis in near real time. The NUDET Detection System (NDS) consists of sensors on the operational Navstar Global Positioning System (GPS). NUDET information supports post-impact selection of appropriate retaliatory options in response to a nuclear attack against North America, as well as strike confirmation, and damage assessment. NUDET detection information is vital to the effective management of U.S. forces through the trans- and post-attack phases of a nuclear conflict. Reports to command centers of weapon effectiveness will be vital in managing strategic reserve forces and re-establishing a command structure. NDS data could be a major information component during negotiations to terminate a nuclear conflict.

3. (U) COMPARISON WITH FY 1988/FY 1989 DESCRIPTIVE SUMMARY: (\$ in thousands)

RDT&E	25,468	10,397	10,932	Continuing	N/A
Missile Procurement	9,338	11,900	0	Continuing	N/A
Other Procurement	2,798	13,891	13,960	Continuing	N/A

EXPLANATION: (U) The congressional reduction of \$3 million RDT&E funding in FY 1988 delays, by one year, the integration engineering for the aircraft NDS terminal. FY 1989 Other Procurement funds were reduced to meet budgetary constraints; defers additional user terminal procurement until full production following IOT&E.

4. (U) OTHER APPROPRIATION FUNDS: (\$ in thousands)

Missile Procurement					
Funds	9,338	11,900	0	Continuing	N/A
Quantities	8	4	0		

Program Element: 0102433F
DOD Mission Area: 332-Strategic Surveillance and Warning

Title: NUDET Detect System (NDS)
Budget Activity: 3-Strategic Programs

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>	<u>Additional</u> <u>to</u> <u>Completion</u>	<u>Total</u> <u>Estimated</u> <u>Cost</u>
Other Procurement (includes funding for initial spares)					
Funds	2,798	14,170	0	Continuing	N/A
Quantities	0	2	0		

5. RELATED ACTIVITIES: NDS sensors are flown on all Navstar Global Positioning System (GPS) satellites (PE 0305165F) beginning with the GPS launch in July 1983. Development and production of the X-ray and optical Nuclear Detection (NUDET) sensors for NDS are funded by the Department of Energy (DOE).

The X-ray and optical sensors are integrated into the GPS satellite under PE 0301357F and PE 0305999F. Production of the airborne NDS terminals will be funded in the Worldwide Airborne Command Post PEs, 0101312F and 0302015F.

6. WORK PERFORMED BY: System development and procurement is accomplished by Air Force System Command's Space Division, Los Angeles AFB, CA. Rockwell International, Seal Beach, CA, integrates the NDS sensors on GPS satellites and produces the Electromagnetic Pulse (EMP) sensor. Scientific Applications International Corporation, Manhattan Beach, CA, and the Aerospace Corporation, El Segundo, CA, provide systems engineering support. Sandia National Laboratories, Albuquerque, NM, and Los Alamos National Laboratory, Los Alamos, NM, are under contract to the Department of Energy (DOE) to produce the X-ray and optical nuclear detonation sensors. Texas Instruments, Dallas, TX, is developing and will produce the Ground/Airborne user terminals. E-Systems, Garland, TX, is developing the EMP receiver/processor for the satellite.

7. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1989: Not applicable.

8. (U) SINGLE PROJECT OVER \$10 MILLION IN FY 1989:

(U) Project: 12433F, NUDET Detection System

A. Project Description: The NDS payload consists of X-ray, optical, and electromagnetic pulse (EMP) sensors on the operational Navstar GPS constellation. These sensors, when coupled with the extremely precise GPS timing capability, will provide location of nuclear bursts worldwide. This project develops and integrates the electromagnetic pulse sensor into the GPS satellite and develops the Ground/Airborne terminals to provide authorized users direct receipt of NDS nuclear detonation data. The data are also cross-linked to other GPS/NDS satellites which act as relay points. This cross-linking of information, when used with at least 18 satellites, will allow a user on one side of the earth to receive detonation data from the opposite side. It also provides multiple

Program Element: 0102433F
DOD Mission Area: 332-Strategic Surveillance and Warning

Title: NUDET Detection System (NDS)
Budget Activity: 3-Strategic Programs

redundancy of the data transmission for increased system availability and survivability. A broad range of users (National Command Authorities, Strategic Air Command, Aerospace Defense Command, other Unified and Specified Commands, will receive nuclear detonation (NUDET) data, direct from the spacecraft, on the precise location, yield, count, time, and height of burst.

B. (U) Program Accomplishments and Future Efforts:

(1) (U) FY 1987 Accomplishments: Development and testing of the electromagnetic pulse (EMP) sensor was completed. NDS user terminal development continued. A user terminal antenna survey was conducted on a EC-135 PACER LINK II aircraft. Mission software tests were performed to reduce risks associated with terminal integration with ground fixed/mobile and airborne command posts. Engineering model tests to verify software/hardware integration continued.

(2) (U) FY 1988 Program: Integration efforts for the EMP sensor and NDS payload will continue on the GPS production spacecraft. The NDS user terminal development effort will continue. Procurement of user ground terminals for high priority users will be initiated. A NDS terminal reliability improvement program will begin.

(3) (U) FY 1989 Planned Program and Basis For FY 1989 RDT&E Request: Engineering development will begin on the NDS payload for the GPS replenishment satellites. Aircraft integration/modification activities will begin to support the Development Test and Evaluation/Initial Operational Test and Evaluation (DT&E/IOT&E) of the aircraft user terminal. A NDS development terminal will be installed at the Alternate Military Command Center in support of testing for the fixed configuration. Production activities will continue. The user terminal reliability program will continue. Costs for the NDS satellite sensor payload are based on previous NDS satellite sensor payload development efforts and are category II, mature, estimates. NDS user terminal development costs are based on similar terminal developments and contract costs, and are category II, mature, estimates. Last comprehensive review of the cost estimate was completed in July 1987.

(4) (U) Program to Completion: This is a continuing program. NDS sensor design and production are keyed to the GPS satellite schedule. The user terminal development program will conclude in early 1990 and NDS user terminal production will continue satisfying ground and airborne terminal users. Outyear RDT&E funds will support the development of fixes for deficiencies found during DT&E/IOT&E and required system operational improvements.

C. (U) Major Milestones:

<u>Milestones</u>	<u>Dates</u>
(1) (U) Defense Systems Acquisition Review Council II	June 1979
(2) (U) Begin Satellite Production	August 1982
(3) (U) Launch 1st NDS Equipped Global Positioning System Spacecraft	July 1983
(4) (U) Launch 1st Operational Satellite	1st Quarter FY 1989**

Program Element: 0102433F
DOD Mission Area: 332-Strategic Surveillance and Warning

Title: NUDET Detection System (NDS)
Budget Activity: 3-Strategic Programs

Milestones

Dates

- | | |
|---|--|
| (5) (U) Start User Terminal Initial Operational Test and Evaluation | *(1st Quarter FY 1989) 1st Quarter FY 1990 |
| (6) (U) Achieve Worldwide 2-Dimensional NUDET Location Capability | *(4th Quarter FY 1989) 3rd Quarter FY 1990** |
| (7) (U) Achieve Worldwide 3-Dimensional NUDET Location Capability | *(4th Quarter FY 1990) 1st Quarter FY 1991** |
| * Date presented in the FY 1988/FY 1989 Descriptive Summary. | |
| ** Launch schedule dependent. | |

(U) Explanation of Milestone Changes

(5) (U) User terminal operational testing delayed due to slip in aircraft modification schedule resulting from the reduction of FY 1988 RDT&E funding.

(6) (7) (U) Operational capability achieved later due to changes in the GPS launch schedule.

9. (U) COOPERATIVE AGREEMENTS: Not Applicable